a heater arranged at the substrate support, the heater supplying the substrate with heat for performing crystallization while the plasma generating device produces plasma inside the chamber.

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the subject application. The Office Action of June 26, 2002 has been received and contents carefully reviewed.

Claims 1-19, 22, and 24-41 are pending in this application. Claim 22 has been amended for consistency with the other independent claims.

The Examiner rejected claims 1-5, 10-13, and 16-19 under 35 USC § 102 (a and e) as being clearly anticipated by Makita et al. (US Patent No. 5,851,860) and rejected claims 7-9, 14, 15, 22, and 34-41 under 35 USC § 103(a) as being unpatentable over Makita et al. (US Patent No. 5,851,860. These rejections are respectfully traversed.

Claims 1 and 2 are allowable at least for the reason that claims 1 and 2 recite a combination of elements including depositing an inducing substance for silicon crystallization on an exposed surface of an amorphous silicon layer by plasma exposure; and annealing the amorphous silicon layer. None of the cited references teaches or suggests each and every element of the claims or teaches or suggests singly, or in combination, at least these features of the claims.

Makita et al. discloses that the semiconductor layer and the insulating film are formed continuously without exposing these layers to the atmosphere and that nickel atoms 105 are implanted through the gate insulating film 104 into the a-Si Film 103 by an ion implantation method. Then, the ion implanted film is annealed to be crystallized...*See* column 13, line 56

to column 14, line 26. Applicants respectfully submit that Makita et al. does not teach each and every element of the claim, namely an *exposed* surface of an amorphous silicon layer. [emphasis added]

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness since Makita et al. teaches away from the invention in that an inducing substance is not deposited on an exposed surface of an amorphous silicon layer, but instead, nickel atoms are implanted on an a-Si film through a gate insulating film.

Makita et al. may teach crystallizing an amorphous silicon film by introducing metal elements and then heat treating the film. But, Makita et al. does not teach or suggest deposition of an inducing substance on an exposed surface of the amorphous silicon layer as recited by at least the independent claims. Makita et al. does not teach or suggest the claimed invention as a whole. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983); see also *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976).

Makita et al. is not attempting to solve similar problems with the same solution. "[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole', which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103." *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). However, "discovery of the cause of a problem . . . does not always result in a patentable invention. . . . [A] different situation exists where the solution is obvious from prior art which contains the same solution for a similar problem." *In re Wiseman*, 596 F.2d 1019, 1022, 201 USPQ 658, 661 (CCPA 1979) (emphasis in original).

For similar reasons, claims 16 and 22 are likewise deemed to be allowable over the cited references. Moreover, claims 3-15, 17-19, and 24-41 are allowable as being dependent on claims 1, 2, 16, and 22, which are believed to be allowable.

Applicants believe the foregoing amendments place the application in condition for allowance and early, favorable action is respectfully solicited. Should the Examiner deem that a telephone conference would further the prosecution of this application, the Examiner is invited to call the undersigned attorney at (202) 496-7371.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136. Please credit any overpayment to deposit Account No. 50-0911.

Respectfully submitted,

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Date: September 30, 2002

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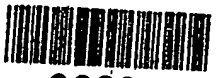

MARKED-UP VERSION OF THE AMENDED CLAIMS

22. (Amended) A crystallizing apparatus, comprising:

a chamber having inner space;

a substrate support arranged in the chamber, the substrate support being used for supporting a substrate having an amorphous silicon layer formed thereon;

a plasma generating device having a metal source connected to a power supply, the plasma generating device producing plasma inside the chamber by supplying the metal bar with RF or DC power from the power supply to deposit a crystallization catalyst on [the substrate] an exposed surface of the amorphous silicon layer;

a heater arranged at the substrate support, the heater supplying the substrate with heat for performing crystallization while the plasma generating device produces plasma inside the chamber.